

Analysis of the Effect of Capital Structure on Business Performance of Building Material Manufacturing Businesses Listed on the Stock Market of Vietnam

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Abstract— The objective of this study is to analyze the effects of capital structure on business performance of construction materials manufacturing enterprises listed on the Vietnam Stock Exchange. The study uses data from 27 enterprises in the building material manufacturing industry listed on the HSX and HNX in the 10-year period from 2012 to 2021. The author analyzes the relationship between capital structure and efficiency, business and then offer solutions to build an appropriate capital structure for enterprises in the domestic building material manufacturing industry.

Keywords— Capital structure, business performance, construction materials.

I. INTRODUCTION

Capital structure suitable to the characteristics of the enterprise is the top concern of managers because this is one of the important strategies to improve business efficiency as well as the competitiveness of the enterprise. The source of capital to finance the operation needs of an enterprise is formed from many different sources such as the owner's own capital, the issuance of additional shares, capital due to appropriation of suppliers, loans from banks, or issue corporate bonds. At different times of business activities, affected by seasonal factors, macro fluctuations or periodic changes in the industry cycle, managers need to consider changing the capital structure accordingly. to ensure that the cost of capital at this time is optimal. Compared with a bank loan, appropriating the partner's capital by late payment of goods can help businesses save a lot of interest costs. Meanwhile, many businesses choose to borrow from banks to benefit from tax shields. Therefore, for any manager, in order for a business to perform well, it must know how to balance its capital structure according to its business lines, take advantage of the cost of capital to maximize benefits. Thereby, choosing the optimal capital structure suitable for the business is extremely important, especially the construction material manufacturing enterprises in the environment of a

developing country like Vietnam because of the construction needs. Civil and infrastructure real estate in Vietnam is quite high, but the receivables turnover is quite long, so an appropriate capital structure is needed for enterprises in the construction material industry to raise capital. money in can be regular to ensure cash out and outflow can be minimal.

II. CONCEPTS

According to Ahmad et al (2012), “*Capital structure is the ratio between debt and equity in the capital of the enterprise to finance production and business activities*” [1]. Sharing the same point of view as Ahmad, Pourahajan & Malekian (2012) also argue that capital structure is the mixed financial source of an enterprise consisting of debt and equity that make up the assets of the enterprise.

According to Professor Nguyen Thanh Do, the definition of business performance: “*Business performance is a category that reflects the level of use of resources to achieve defined business goals. Only business enterprises aim at profit maximization and therefore need to evaluate business performance*” [2]. In short, the business performance of an enterprise is an economic

category that reflects the relationship between the business results obtained by the enterprise and the costs or resources spent to achieve that result, expressed through profitability indicators of the business.

III. RESEARCH RESULTS

3.1. Description of research data

The author synthesizes research data from financial statements as well as financial indicators of 27 enterprises in the construction material manufacturing industry listed on the HSX and HNX. The study period was 10 years from 2012 to 2021. The study had a total of 270 observations, and is shown in panel data.

Table 1: Preliminary statistical results

Variable	Number of observations	Medium	Standard deviation	minimum value	maximum value
ROA	270	0.086837	0.088677	-0.0872	0.413442
TD	270	0.511403	0.200006	0.058928	0.877857
STD	270	0.444289	0.245085	0.075124	3.329579
SD_TD	270	0.847145	0.208434	0.160131	1
SIZE	270	28.28015	1.441867	25.31466	32.81413
GR	270	0.127816	0.261329	-0.26227	2.513363
TURN	270	1.29349	0.832789	0.156912	4.873004

Preliminary statistical results show that the ROA variable in the period 2012-2021 has an average value of 8.68%, realizing that the ROA of construction materials manufacturing enterprises is lower than that of other industries. In which, the average ratio of total debt to total assets of enterprises in the industry is 51%, of which the ratio of short-term debt to total assets accounts for 44%. The control variable Scale SIZE is encoded as the natural logarithm of Total Assets. SIZE ranges from 25.3 to 32.8 and has a mean value of 28.2 with a standard deviation of around 1.44. Variable Growth GR with mean of 12.78% and standard deviation of 0.26. In which, there are

businesses with a significant decrease in revenue like SMC in 2015 with a value of -26.23% and businesses with outstanding high revenue growth like DNP with a growth of 251.24%. in 2016. The TURN Asset Turnover variable has a mean of 1.29, a standard deviation of 0.83 with a variation ranging from 0.16 to 4.87 (VGS has the largest TURN value of 4.87 in 2018 and CTI has the smallest value in 2014 with a value of 0.16).

3.2. Correlation analysis of variables in the model

* Correlation matrix:

Table 2: Correlation Matrix

	ROA	TD	STD	SD_TD	SIZE	GR	TURN
ROA	1						
TD	-0.6262	1					
STD	-0.3578	0.3007	1				
SD_TD	0.1806	-0.3929	0.2986	1			
SIZE	-0.2112	0.5052	0.0896	-0.3069	1		
GR	0.1698	0.2038	-0.0435	-0.2322	0.1587	1	
TURN	-0.0409	0.1495	0.2619	0.4309	-0.0515	-0.0892	1

Based on the results obtained above, the author found that the group of variables TD, STD, SIZE, TURN has a negative correlation with the dependent variable ROA; and vice versa, groups of variables SD_TD and GR

have a positive correlation with ROA. The results from the correlation model show that the variables in the model have a relatively low correlation and there is no

autocorrelation between the variables because no pair of variables has a correlation coefficient greater than 0.5.

*** Checking for multicollinearity:**

Table 3: Multicollinearity Current Test

Variable	VIF	1/VIF
TD	2.12	0.471839
SD_TD	2.06	0.484608
TURN	1.46	0.686679
STD	1.42	0.702249
SIZE	1.38	0.723598
GR	1.08	0.926833
Mean VIF	1.59	

A VIF value greater than 2 is considered multicollinear. Realizing that there are two variables TD, SD_TD in the model with VIF values greater than 2, that is, there is multicollinearity. With the remaining 4 variables, the VIF of each variable meets the condition less than 2. However, when considering the overall, the average VIF of 1.59 is significantly smaller than that of 2,

at this point the author considers ignoring the error. small in these two variables and general conclusion is that the model does not have multicollinearity.

3.3. Model estimation results

3.3.1. Check for suitable model selection

Table 4: Hausman test results

	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
TD	-0.27168	-0.29813	0.0264446	0.0236181
STD	-0.03143	-0.0337	0.00227	0.0036908
SD_TD	0.032361	0.018988	0.0133738	0.0112672
SIZE	0.009057	0.007109	0.001948	0.0037112
GR	0.097985	0.099152	-0.0011673	0.0023358
TURN	0.02596	0.020308	0.0056522	0.0045629
Inspection results: Prob>chi2 = 0.7012				

After conducting Hausman test, the author found that $\text{Prob}>\text{chi2} = 0.7012 > 0.05$. Thus, there is not enough basis to reject hypothesis H_0 , accept H_0 . This means that

compared with the FEM model, the random effect factor model (REM) is a more suitable research model.

Table 5: Summary of F-test and Hausman test results

	Statistical	Value Test	P - value	Chọn
OLS và FEM	F-test	$F(26, 237) = 12.58$	$\text{Prob} > F = 0.0000$	FEM
FEM và REM	Hausman	$\text{Chi2}(6) = 3.82$	$\text{Prob} > \text{chi2} = 0.7012$	REM

Thus, after testing the suitability of the three models by two F-test and Hausman, the author chooses the random effect factor model REM as a suitable model for the study of the influence of the structure. capital structure

to business performance of 27 enterprises in the construction material manufacturing industry listed on the Ho Chi Minh City and Hanoi stock exchanges in the 10-year period from 2012 to 2021.

3.3.2. Random Effect Model (REM)

. xtreg ROA TTD SD SD_TD SIZE GR TURN, re

Random-effects GLS regression
 Group variable: CodeMH

R-sq: within = 0.3884 between = 0.5767 overall = 0.5146 corr(u_i, X) = 0 (assumed)	Number of obs = 270 Number of groups = 27 Obs per group: min = 10 avg = 10.0 max = 10 Wald chi2(6) = 183.18 Prob > chi2 = 0.0000
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ROA	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
TTD	-.298127	.034743	-8.58	0.000	-.3662221 -.230032
SD	-.0336999	.0156147	-2.16	0.031	-.0643042 -.0030956
SD_TD	.0189876	.0269937	0.70	0.482	-.033919 .0718942
SIZE	.0071086	.0046451	1.53	0.126	-.0019955 .0162128
GR	.0991524	.0115377	8.59	0.000	.0765389 .1217659
TURN	.0203079	.0068995	2.94	0.003	.0067852 .0338307
_cons	-.0017879	.1372202	-0.01	0.990	-.2707346 .2671587
sigma_u	.0498654				
sigma_e	.04183401				
rho	.58691716				(fraction of variance due to u_i)

Fig.1: Results of the REM model

The source: Stata 16

The results of the regression of the variables according to the REM model show that Prob > F = 0.0000 < 0.05, that is, the model fits the collected data. At this time, we consider the P-value of each independent variable to determine the significance level of the independent variable to the dependent variable ROA. The variables SD_TD and SIZE have P-values of 0.482 and 0.126 greater than 0.05, respectively, which means that the

dependent variable ROA is not affected. The variables TD, STD have a negative effect and have statistical significance on ROA, whereas control variables such as GR, TURN have a positive and statistically significant effect on ROA.

3.3.3. Defect testing of the REM . model

* Test of Variance of Variation (PSSS):

Table 6: Variable PSSS test of the REM model

Breusch and Pagan Lagrangian multiplier test for random effects		
	Var	sd = sqrt(Var)
ROA	0.007864	0.0886772
e	0.00175	0.041834
u	0.002487	0.0498654

Test: Var(u) = 0
chibar2(01) = 315.59
Prob > chibar2 = 0.0000

Looking at the table of results above, we see that Prob > chibar2 = 0.000 < 0.05, rejecting hypothesis H0, accepting H1. This means that the model has the phenomenon of variable variance.

* **Test the phenomenon of autocorrelation of REM model** by Wooldridge test through the statement "xtserial Dependent variable Independent variable":

Table 7: Autocorrelation test of REM model

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F(1,26) = 42.106
Prob > F = 0.0000

The author finds that Prob > F=0.0000 < 0.05, so the hypothesis H0 is rejected and hypothesis H1 is accepted, ie the model occurs autocorrelation.

* **Fix defects of REM model:**

Table 8: Fixing defects of REM model by FGLS model

ROA	Coef.	Std. Err.	z	P > z	[95% Conf. Interval]
TD	-0.3144742	0.0265924	-11.83	0	-0.36659 -0.26235
STD	-0.0197104	0.0159099	-1.24	0.215	-0.05089 0.011473
SD_TD	-0.0018139	0.0200848	-0.09	0.928	-0.04118 0.037552
SIZE	0.0077098	0.003337	2.31	0.021	0.00117 0.01425
GR	0.0909992	0.0089323	10.19	0	0.073492 0.108506
TURN	0.0115725	0.0043538	2.66	0.008	0.003039 0.020106
_cons	0.0111946	0.0929797	0.12	0.904	-0.17104 0.193432

Through the above table of regression results, we see that the variable TD, GR and TURN has a significance level of 1% expressed through a P-value of less than 1 and the control variable SIZE has a significance level of 5%. In contrast, the two independent variables STD, SD/TD have P-values of 0.215 and 0.928 greater than 0.05, respectively, which means that these two variables are not statistically significant in correlation with the independent variable ROA. In 4 variables with statistical significance, the independent variable the ratio of total debt to total assets has a negative relationship with the independent variable ROA, 3 control variables such as SIZE, TURN, GR have a positive impact with ROA. The regression model is rewritten as follows:

$$\begin{aligned}
 ROA_{it} = & \mathbf{0.0111946} - \mathbf{0.3144742} TD_{it} \\
 & + \mathbf{0.0115725} TURN_{it} \\
 & + \mathbf{0.0909992} GR_{it} \\
 & + \mathbf{0.0077098} SIZE_{it} + u_{it}
 \end{aligned}$$

3.4. Discussing research results

The effect of the variable Total debt on total assets on the dependent variable ROA is (- 0.3144742), which shows that the correlation between total debt to total assets and business performance is negative. The impact of the variable Firm size SIZE has a positive impact with the ROA variable in the building materials industry. The impact of the variable GR growth opportunity of the enterprise and the business performance of the enterprise has a positive relationship. And the impact of the TURN asset turnover variable on the ROA dependent variable is 0.0115725,

showing that the correlation between the TURN asset turnover ratio and business performance is positive.

IV. CONCLUSION AND SOLUTION

4.1. Conclude

Through studying data of 27 construction material manufacturing companies listed on the Vietnam Stock Exchange in the 10-year period from 2012 to 2021. With a total of 270 observations, the model includes 7 variables, in which there is 1 dependent variable ROA and 6 dependent variables respectively TD, STD, SD/TD, SIZE, GR, TURN. The author uses 3 regression models, respectively, which are Pooled OLS, fixed-effect factor model FEM, and random-effect factor model REM. Then the author uses 2 tests F-test and Hausman to choose the model that best fits the research data among the three models above. Finally, the author proceeds to correct the existing defects of the REM fitting model by using the FGLS model. Results from the FGLS regression model, the author makes the conclusion that the ratio of total debt to total assets TD has a negative relationship with business performance of enterprises. Three control variables SIZE, TURN, GR have the same effect and have statistical significance with ROA. The results are consistent with the original expectations of the author. However, the two variables Ratio of short-term debt to total assets STD and Ratio of short-term debt to total debt SD_TD have a negative effect on ROA but not statistically significant.

4.2. Solution

Building material manufacturing companies should aim to scale up to take advantage of large scale to improve business performance. Enterprises need to regularly carry out periodic maintenance and preventive repairs as planned to ensure that fixed assets are still in good working order, and to avoid unexpected damage that will delay production and business activities, causing excessive consequences. Unfortunately, such as breach of contract because of not handing over enough products to purchasing partners. Growth opportunity is a factor that positively affects business performance. Besides, it is necessary to consider building a reasonable capital structure or in other words, consider the ratio of debt to total assets. Enterprises need to diversify sources of funding for their production activities. Currently, the Vietnamese financial market has appeared many financial instruments and financial intermediaries to help businesses access idle capital in the economy. However, due to limited information on these new tools and caution from business managers, businesses miss out on many sources of capital with low cost and suitable conditions.

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